Operating instructions

Motor-Diaphragm Dosing Pumps
Types MEMDOS MR

Dosing | *Liquids*
Conveying | *Gases*
Control | *Systems*

Operating instructions
MEMDOS MR
Lutz-Jesco GmbH, 2003

Address:
Lutz-Jesco GmbH
Am Bostelberge 19
D-30900 Wedemark
PO Box 10 01 64
D-30891 Wedemark

Tel.: +49 (0) 51 30 58 02-0
Fax: +49 (0) 51 30 58 02 68
E-Mail: info@jesco.de
Internet: www.jesco.de

24h-Hotline:
+49 (0) 51 30 580 280

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1. Safety

1.1 General

This Operating Manual contains basic information to be noted during installation, operation and maintenance. It is therefore essential that the Manual be read by the fitter before installing and commissioning the pump/system, as well as by the relevant operating personnel / owner of the pump/system. It must remain accessible at the pump/system for reference at all times.
In addition to the general safety instructions set out under this main heading Safety, the special safety precautions set out under the other main headings must also be observed, for instance in conjunction with private use.

1.2 Warnings used in this Operating Manual

This Operating Manual contains warnings which may endanger persons, the environment and the pump/system if they are disregarded. These warnings are identified by the hazard symbol

safety mark in accordance with DIN 4844-W9

The following symbol is used in conjunction with electric power

safety mark in accordance with DIN 4844-W8

The word

Caution

appears in conjunction with safety instructions which may endanger the machine and its operation if disregarded.

Markings which are affixed directly to the pump, such as
- Direction of rotation arrow
- Markings for fluid connections

must be observed without fail and must remain fully legible at all times.

Note

Draws attention to supplementary information to make the work easier and ensure troublefree operation.

1.3 Qualification and training of personnel

The personnel employed for operation, maintenance, inspection and installation must be suitably qualified for this work. The areas of responsibility, competence and supervision of the personnel must be precisely defined by the owner. Personnel who do not have the requisite know-how must be duly trained and instructed. If necessary, this can also be undertaken by the manufacturer/supplier on behalf of the pump's owner. In addition, the owner must also ensure that the relevant personnel are fully familiar with and have understood the contents of the Operating Manual.

1.4 Hazards due to non-compliance with the safety instructions

Failure to comply with the safety instructions may endanger not only persons, but also the environment and the pump/system. Non-compliance with the safety instructions can lead to the loss of all entitlement to damages.
The following hazards in particular may arise:
- Failure of major pump/system functions.
- Failure of specified methods for maintenance and repair.
- Danger to persons due to electrical, mechanical and chemical effects.
- Danger to the environment due to leakage of hazardous substances.

1.5 Safe operation

The safety instructions contained in this Operating Manual must be observed. The owner is responsible for ensuring compliance with local safety regulations.

1.6 Safety instructions for the owner/operator

- If hot or cold machine parts are a source of danger, precautions must be taken by the customer to prevent contact.
- Guards on moving parts must not be removed when the machine is in operation.

- Leakages (e.g. at the shaft seal) of hazardous substances (e.g. explosive, toxic, hot substances) must be discharged in such a way as to exclude all danger to persons and the environment. Statutory regulations must be observed.
- Danger due to electric power must be excluded (for further details, refer to the VDE regulations and the regulations of the local public utilities).
- Separate regulations must be observed if the dosing pumps are operated in explosion-hazard areas. The explosion hazard must be defined (classification of zones) and appropriate equipment selected by the owner. Further information can be found in section 7.1 (Installation), section 7.5 (Electrical connection) and section 11 (Explosion-proof dosing pumps).

1.7 Safety instructions for inspection, maintenance and installation work

The owner must ensure that all maintenance, inspection and installation work is undertaken by authorized and duly qualified skilled personnel who have also studied the Operating Manual in depth.
The pump must always have come to a complete stop before starting any work on the pump. The procedure specified in the Operating Manual for shutting down the pump/system must be observed without fail.
Pumps or units in contact with potentially harmful media must be decontaminated.
All safety mechanisms and guards must be refitted and reactivated as soon as the work is complete.

Particular care must be taken when repairing dosing pumps which are used in explosion-hazard areas. Due to the risk of sparking, care must be taken to prevent metal parts or tools knocking against one another. The dosing pump should preferably be moved out of the explosion-hazard area in order to be repaired.
The points set out in the section Installation and commissioning must be observed before starting the pump/system.

1.8 Unauthorized modification and production of spare parts

The machine may only be modified or converted in consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer ensure greater safety. Liability for damage or loss may be extinguished if other parts are used.

1.9 Impermissible modes of operation

The operational safety of the pump supplied can only be guaranteed when it is used in conformity with its intended use as specified in our contract documents, especially the letter confirming the order. The limit values specified in these documents must never be exceeded.

1.10 Dosing of chemicals

- When working on dosing installations, the local safety rules must be observed (e.g. wear personal protective clothes).
- Before working on the dosing pump and plant, disconnect it from the mains supply and protect it against reconnection. Before the power supply is switched on again, the dosing lines must be connected so that any chemical left in the dosing head cannot spurt out.
- The dosing head of the pump as well as connections and lines of the plant may be under pressure. Working on the dosing plant requires special safety precautions and may only be carried out by instructed technical personnel.
- Before startup, all screwed connections must be checked for correct tightness and, if necessary, must be tightened up using appropriate tools.
- If connections at the dosing head are unscrewed during operation for venting or other reasons, leaking chemical must be removed professionally. This is the only way to avoid the danger of physical injury and corrosion at the dosing pump. Leaking chemical might also destroy the diaphragm at its mounting points.

- When changing the chemical, check whether the materials used for the dosing pump and the other plant parts are chemically resistant. If there is the danger of a chemical reaction between different media, a thorough cleaning first is mandatory.
- To operate the pump mount the fan shell in order to ensure sufficient cooling of the motor.

- Adjustment works in the interior of the ATE drive (optional) must be carried out carefully. Connections and internal limit switches might be "alive".
- Additional limit switches might be "alive" even with the auxiliary voltage switched off (ATE-drive).

- After installation works at the ATE servomotor or before startup remount the cover.

1.11 Scope of delivery

Note

Please unpack the dosing pump and ordered accessories carefully in order not to miss small parts. Immediately compare the scope of delivery to the delivery note. If there are any discrepancies, try to find out the reason.

For the transportation of the dosing pumps, no special fittings are required. It is, however, advisable to choose a transportation method, which is appropriate for the weight of the dosing pumps (e.g. wagon). During transportation without oil, the dosing pump should be lying. Otherwise it must be tightened to the transportation device.

2. General, purpose

Motor-driven diaphragm dosing pumps of series **MEMDOS MR/ZMR** are used in industry, in process engineering and in water and wastewater processing. Standard versions are dosing pumps with the head located on the left-hand side. (**MR...L**)
Versions with the head on the right-hand side can be supplied. (**MR...R**)

MEMDOS ZMR pumps are tandem dosing pumps with two dosing heads of equal size or combinations of different dosing heads (**ZMR.../...**). The power of the motor is the same for simplex and duplex dosing pumps because the diaphragms operate in a push-pull arrangement.

- If no control is required for constant metering, the motor is connected directly to the terminal box. In this case, **MEMDOS MR/ZMR** pumps are used. Three-phase and a.c. motors are available. To change the dosing capacity, either the stroke length can be adjusted from 0 to 100% or the speed of the three-phase motor can be controlled by means of a separate frequency converter.
- The **MEMDOS MR/ZMR** is optionally available with electrical remote adjustment (**ATE**) allowing the dosing pump to be used as actuator in control loops. The stroke length is adjusted via momentary contacts or controllers with relay output. In the case of duplex pump **MEMDOS ZMR**, each head may be fitted with a separate servomotor and adjusted independently.
- Upon request, also „increased safety“-type or „air-tight“ servomotors can be supplied.

3. Functional

The gear contains a single-stage worm wheel set runing in an oil bath just as the roller bearings. Dosing happens while the push rod is displaced by means of an eccentric. The suction stroke is caused by the resetting of the spring. The stroke length is adjusted by limiting return travel of the poppet using a manually adjustable eccentric as stop. An adjustment range from 0 to 100% is possible.

4. Technical data

4.1 Technical data MEMDOS MR

Simplex dosing pumps

MEMDOS MR		**400**	**600**	**980**
max. pressure	bar	5	5	4
at max.	l/h	440	640	990
pressure	ml/Hub	165	165	165
strokes/min		47	70	101
diaphragm ø	mm	185	185	185
weight	kg K.-St	38	38	38
	E.-St	48	48	48

Duplex dosing pumps with equal heads

MEMDOS ZMR		**50/50**	**75/75**	**115/115**	**140/140**	**210/210**	**290/290**	**400/400**	**600/600**	**980/980**
max. pressure	bar	10	10	10	10	10	10	5	5	4
at max.	l/h	50/50	90/90	135/135	160/160	240/240	290/290	440/440	640/640	990/990
pressure	ml/Hub	20	20	20	37	37	48	165	165	165
strokes/min		47	70	101	70	101	101	47	70	101
diaphragm ø	mm	90	90	90	120	120	150	185	185	185
weight	kg K.-St	38	38	38	38	38	40	50	50	50
	E.-St	48	48	48	48	48	53	60	60	60

Duplex dosing pumps with different heads

MEMDOS ZMR		**50/400**		**75/140**		**75/600**		**115/210**		**115/290**		**115/980**		**140/600**		**210/290**		**210/980**		**290/980**	
max.pressure	bar	10	5	10	10	10	5	10	10	10	10	10	4	10	5	10	10	10	4	10	4
at max.	l/h	55	440	90	160	90	640	135	240	135	290	135	990	160	640	240	290	240	990	290	990
pressure	ml/Hub	20	165	20	37	20	165	20	37	20	48	20	165	37	165	37	48	37	165	48	165
strokes/min.		47		70		70		101		101		101		70		101		101		101	
diaphragmø	mm	90	185	90	120	90	185	90	120	90	150	90	185	120	185	120	150	120	185	150	185
weight	kg K.-St	49		38		49		38		40		41		41		40		49		49	
	E.-St	55		48		55		48		53		55		55		50		55		55	

4.2 Electrical motor data

Elect. motor Type	Part No.	Circuit	Voltage V	Current consumption A	Power kW	Speed 1/min	Frequency Hz	Prot. class ISO cl.	Prot. class IP
AF 80 / 4A-11	78629	Δ Y	230/400	2.6 / 1.55	0.55	1390	50	F	55
AF 80 / 4B-11	78903	Δ Y	230/400	3.5 / 2.0	0.75	1400	50	F	55
AF 80 / 4B-11	78982*	Δ Y	230/400	3.5 / 2.0	0.75	1400	50	F*	55

* Motor fitted with cold-conductor thermometer probe

4.3 Technical data ATE-drives

Types AR 30W23 and AR 30W23S

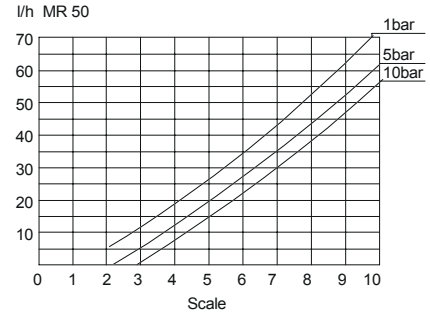
Type	**AR 30W..**	**AR 30W..S**
Design	Reversible a.c. motor with self-locking reduction gear	
Use	for controllers with switching output (3-point control)	for controllers with continous output (2...10V or 4...20mA)
Auxiliary voltage	230V~ ± 15% 50...60 Hz	24V ~ ± 20% 50...60 Hz
Control		2...10V or 4...20mA
Power consumption	2 W	7 W
Regulating time/bevel	360s / 270° = 0...100%	
Position repeating signaling for remote display	Potentiometer 0.5 W 0...1000 Ω = 0...100%	0...620mV = 0...100%
Limit switch	Internal limit switches for limiting angle of rotation. Signaling of final position via terminals 16 and 17	Internal limit switches for limiting angle of rotation.
Protection class	IP 55 (EN 60529)	
Ambient temperature	-20 ... 60°C	
Options		
2nd potentiometer	0...1000 Ω 0.5 W	
Limit switches (2 off)	max. 250V 1A	

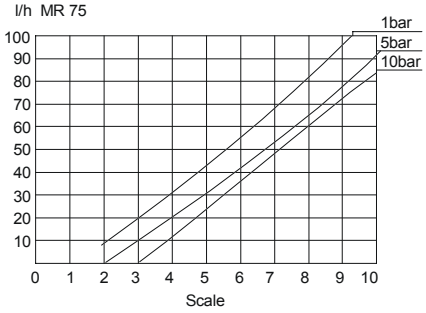
Types WAN 1 and WAN 1-S

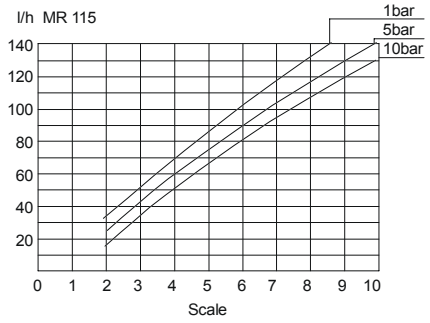
Type	**WAN 1**	**WAN 1-S**
Design	Reversible a.c. motor with self-locking reduction gear	
Use	for controllers with switching output (3-point control)	for controllers with continuous output 0(4)...20mA
Auxiliary voltage	230V~ ± 10% 50...60 Hz Other voltages upon request	230V~ ± 10% 50...60Hz
Control		0(4)...20mA
Power consumption	approx. 11.5 W	
Regulating time/bevel	360s / 270° = 0...100%	
Position repeating signaling for remote display	Potentiometer 0.5 W 0...1000 Ω = 0...100%	0(4)...20mA (as an option only)
Limit switch	Internal limit switches for limiting the angle of rotation. Signaling of the final position via terminals 4 and 5	
Protection class	IP 54 according to DIN 40050	
Ambient temperature	max. 60°C	
Options		
2nd potentiometer	0...1000 Ω 0.5 W	
Limit switches (2 off)	max. 250V 1A	

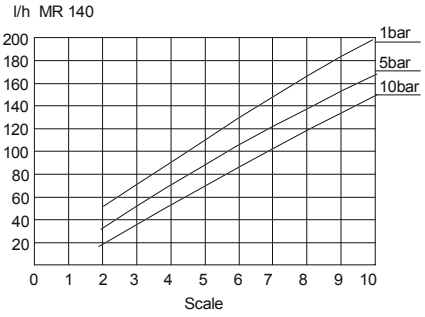
5. Performance curves

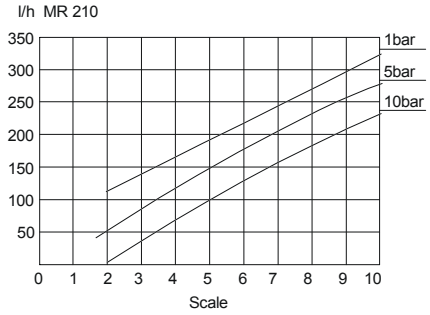
run with water, suction lift approx. 0.5 m

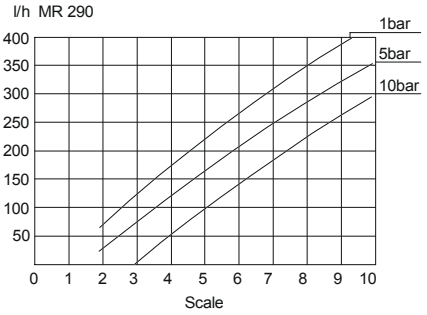


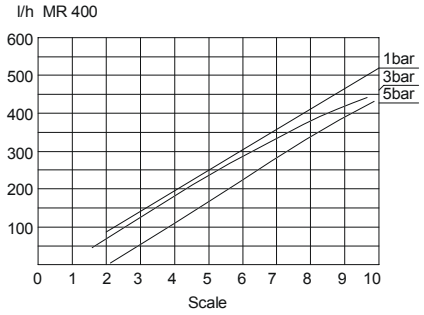


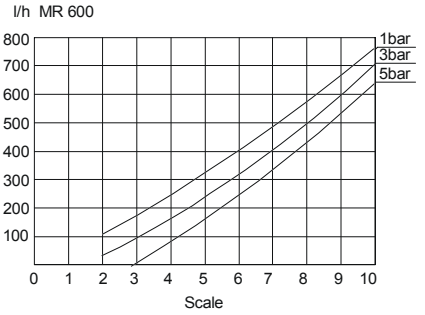


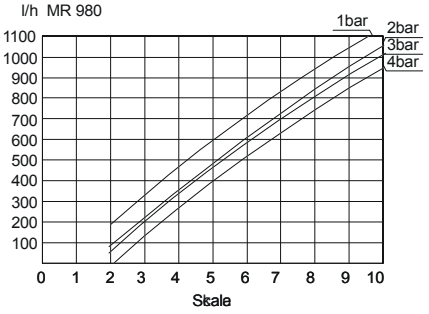








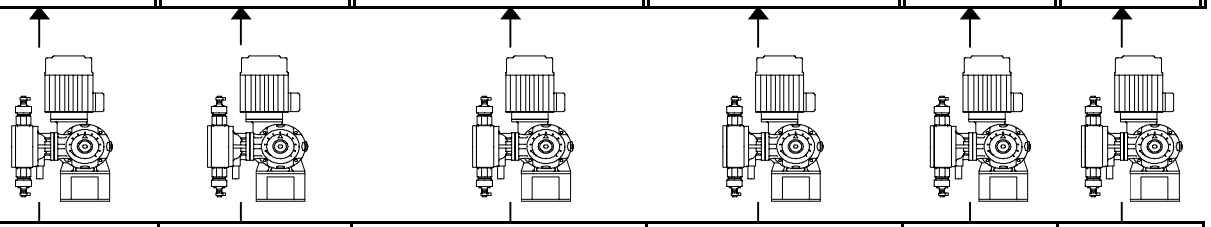




0 1 0 5	1							

MATCH-CODE

number of dosing heads
1-Simplex pump
2-Duplex pump



Capacity/ Nominal size	Head material	Capacity adjustment	Electrical drive	Suction valve Discharge valve	Suction connection	Discharge connection
0400 MR 400 0600 MR 600 0980 MR 980	P - PP S - St. steel 1.4571 Z - Special material	M - Man. adj. E - ATE adj. Z - Special adj.	Three-phase motor 0.55 kW A - 400/50/55/F Three-phase motor 0.75 kW B - 400/50/55/F Z - Special drive (other electrical data)	Spring-loaded single ball valves with seals made of: 5 - Hypalon 6 - Viton 9 - Special valve	Hose liner H - d 25 MR 400 only Cemented connection L - d 32 M - d 40 Threaded connection P - G 3/4 MR 400 only Q - G 1 Flanged connection X - DN 25, PN 16 Z - Special connection	

N - 400/50/55/F
explosion-proof, increased safety E Ex e II T3

O - 400/50/55/F
explosion-proof, air-tight
E Ex de II C T4

A.C. motor
V - 230/50/55/F
Type of circuit S 604 (especially rewound A.C. motor with starting and operating capacitor)

Frames indicate the standard version, e.g.: P - PP

For order example and explanation see general "MATCH CODE SYSTEM" page.

7. Installation

7.1 General notes of instruction

For the selection of a dosing pump when designing a plant as well as for the installation and operation, the local rules must be observed. This applies to the selection of suitable pump materials, the handling of the chemicals and the electrical installation.

Before installing the pump in explosion-hazard areas, the dosing pump must be checked to ensure that it meets with the minimum requirements imposed by the applicable explosion protection regulations. For this purpose, the data on the rating plate of the dosing pump must be compared with the local requirements.

At the same time the technical data of the dosing pump (see chapter 4) must be taken into consideration, and the plant must be designed correspondingly (e.g. pressure loss in lines depending on nominal diameter and length).

Note

The designer and the user are responsible to make sure that the whole plant including the dosing pump is constructed so that neither plant equipment nor buildings are damaged serverely in the case of chemical leakage due to the failure of wear parts (e.g. diaphragm rupture) or burst tubing. If the chemical plant represents a potential source of danger, the installation must be carried out so that no unreasonably high consequential damages occur even if the dosing pump fails. Therefore we recommend to install leakage probes and containment tanks.

Dosing pumps are produced according to highest quality standards and have a long service life. Nevertheless some parts are subject to wear (e.g diaphragm, valve seats, valve balls). To ensure long operating life, visual checks are required regularly. Operating and maintenance personnel must be able to access the pump easily. Periodic maintenance protects the dosing pump against shutdowns.

To increase the dosing accuracy and to ensure the functional reliability, we recommend to use additional fittings. These include backpressure valves, relief valves, leakage probes, low level indicators and especially pulsation dampers to prevent pressure surges, as shown in the installation examples (chapter 7.6).

Always use appropriate tools for the installation of plastic connecting parts. To avoid damage, never apply excessive force. Plast parts (especially PVC parts) can be screwed and unscrewed more easily if the thread is lubricated with silicone grease before.

Note

For this purpose, the compatibility with the chemical to be metered must be checked.

7.1.1 Installation of MEMDOS MR with ATE-servomotor

The ATE servomotor is connected to the pump and adjusted in the factory.

For installation a sufficient mounting space of at least 150 mm must be provided for later maintenance works.

The electrical connection of the ATE drive must correspond to the local rules and may only be carried out by technical personnel.

The circuit diagrams (chapter 7.5.1) show the two basically realizable possibilities of connection.

Cable type and cable cross section must be chosen according to the motor data.

The cable passage to the motor terminal box must be made professionally. We recommend gland screw connections with traction relief.

The required protection class must be ensured by professional installation of the electrical connections.

Caution

Please take into account that the ATE drive can only be controlled with the main motor running, i.e.: the ATE drive must be locked electrically. Otherwise the adjusting eccentric wears out frequently or is destroyed.

7.2 Installation location

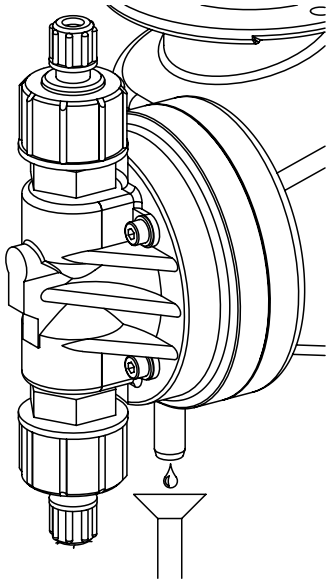
Caution

Ambient temperatures exceeding 40°C are not permitted. Radiant heat of apparatus and heat exchangers must be shielded so that the dosing pump can still dissipate its own heat sufficiently. Exposure to direct sunlight must be avoided. If the dosing pump is installed outside, provide a roof to protect it against weather.

Mount the pump so that the suction and discharge valve are in vertical position. To ensure that the pump stands firm, fasten it with screws on an appropriate foundation.

The system piping must not exert any force on the connections and valves of the metering pump. To avoid incorrect metering after the process is finished, provide an electric and hydraulic interlocking system.

7.3 Drain pipe



Caution

Drainage or leakage from the separating chamber must be routed with a certain downward slope to the containment tank. By no means must the drain pipe be returned directly to the chemical through the tank cover because otherwise effervescent media might enter the pump gear. The drain pipe may only be routed to a collecting tank free of gases (with a downward slope) or to a collecting funnel - also with a downward slope - above which the pipe ends at a sufficient distance. Leakage can be returned via the funnel through the tank cover. Besides, possible leakage can be seen at the funnel.

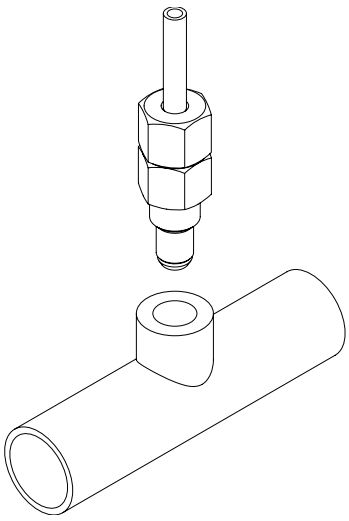
Caution

If a leakage monitor is installed in the explosion-hazard area, the electrical connection must be intrinsically safe. The drive motor must be electrically interlocked to prevent additional medium escaping if a leak occurs.

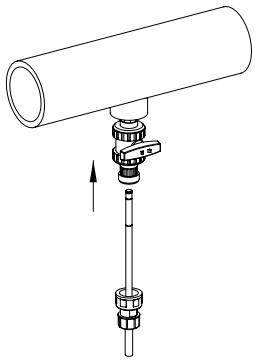
7.4 Injection fitting assembly

Injection fittings are used to mix the metered medium into a main stream and simultaneously fulfil a non-return function. The injection fitting is usually installed in the main line from above. Installation from below is only recommended in the case of media with a tendency to crystallize, in order to ensure that air bubbles are not entrapped. For this type of installation, it is advisable to select a form in which the injection fitting can be sealed off when removed.

Injection fitting S from above:



Extractable injection fitting from down below



7.5 Electrical connection

- The electrical connection of the dosing pump must be made according to the local rules and may only be carried out by technical personnel.
- Cable type und cable cross section of the supply lines must be selected according to the motor data.
- The cable passage to the motor terminal box must be made professionally. We recommend gland screw connections with traction relief.
- The required protection class must be ensured by professional installation of the electrical connections.

Caution

Dosing pumps with explosion-proof motors must be installed and commissioned by specialists qualified to work with equipment destined for use in potentially explosive atmospheres. The user is responsible for ensuring that the explosion-proof motors are connected correctly.

- Both the motor and the pump must be grounded to prevent electrostatic discharges.

Electrical connection data

(other types upon request)

Pump model	Voltage [Volt]	Power [kW]	Current [A]
MR 50 ... MR 980	400/230 50 Hz	0.55	1.50/2.60
MR 50 ...MR 980	400/230 60 Hz	0.55	1.25/2.20
MR 50 ...MR 980	440/254 60 Hz	0.55	1.25/2.20
MR 50 ...MR 980	400/230 50 Hz	0.75	2.00/3.50
MR 50 ...MR 980	400/230 60 Hz	0.75	1.75/3.05
MR 50 ...MR 980	440/254 60 Hz	0.75	1.70/310

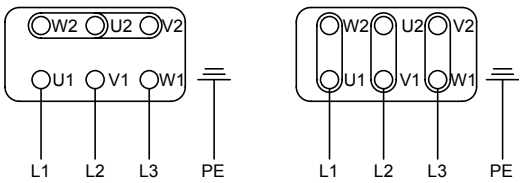
Circuit diagram of the drive motor

Caution

To avoid early wear of the gear drive adhere to the correct rotation direction of the motor by all means:

looking at the fan wheel, counterclockwise.

- 3-phase supply



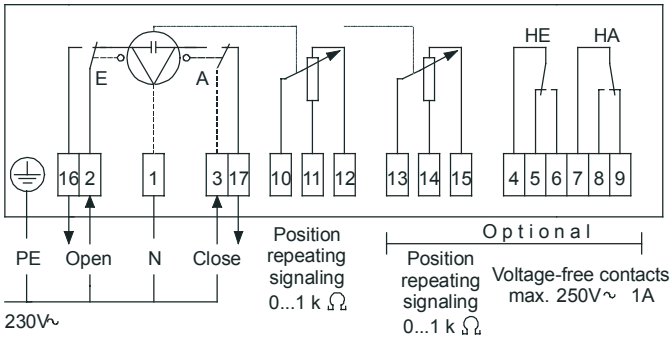
Y-connection Δ-connection

- Special versions

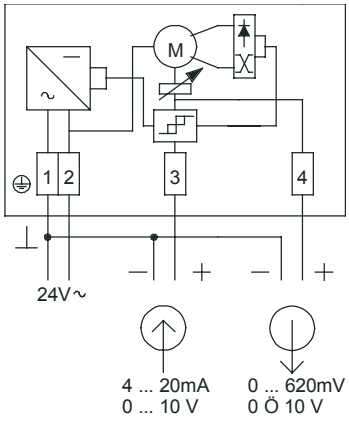
For other special versions please refer to the corresponding separate circuit diagrams.

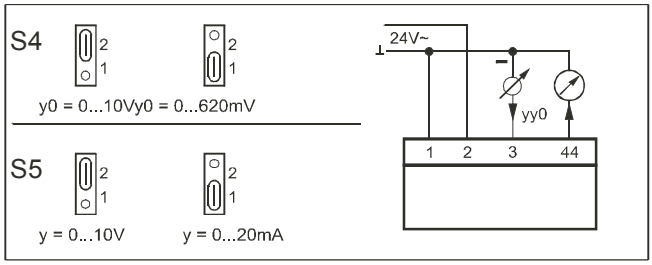
7.5.1 Circuit diagram for ATE-servomotors

Type AR 30W23 F001 230V~ and AR 30W23 F020 24V~

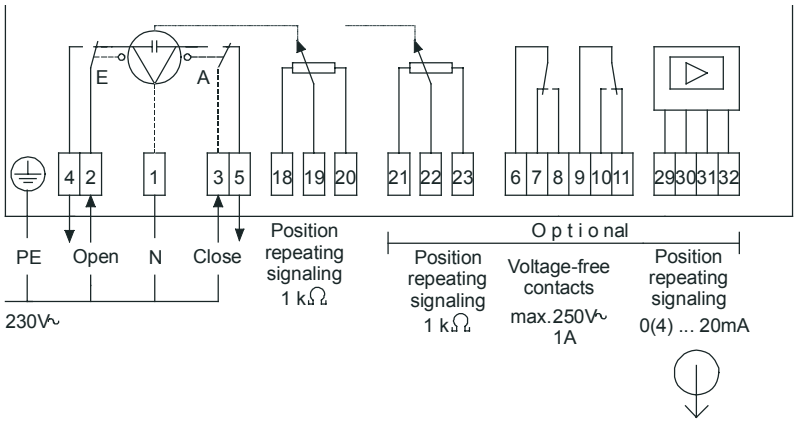


Type AR 30W23S F020 24V~

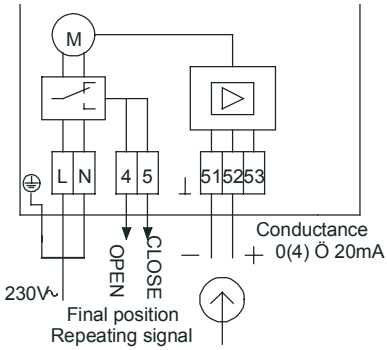




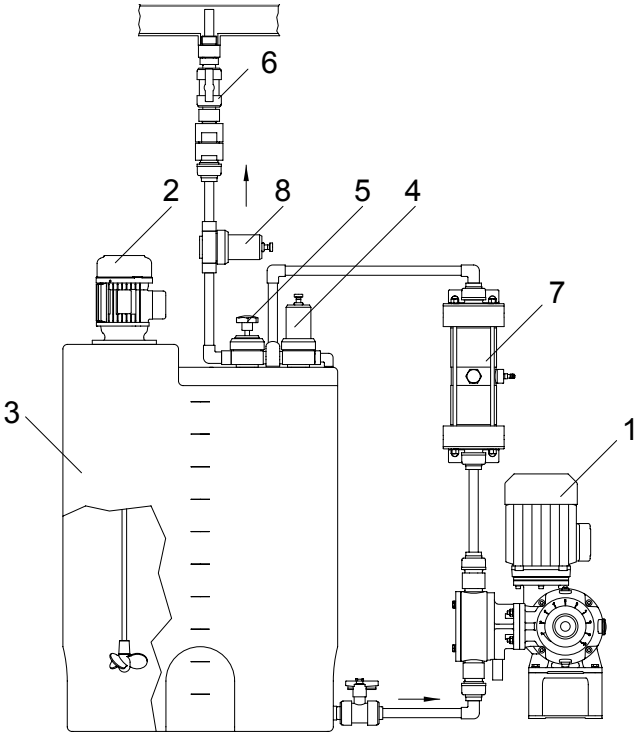
Type WAN 1



Type WAN 1-S



7.6 Installation example



Explanation:
1 MEMDOS MR
2 Electric agitator
3 Chemical tank
4 Relief valve
5 Diaphragm shutoff valve
6 Injection fitting
7 Pulsation dampener
8 Backpressure valve

8. Stroke length adjustment

Caution

The stroke length must not be adjusted when the pump is at a standstill !

Proceed as follows to adjust the stroke length:

1. Turn the screw securing the adjusting knob anticlockwise (to the left) to release it.
2. Set the stroke length to the required value in accordance with the delivery characteristics (chapter 5).
3. Retighten the screw without changing the set stroke length.

9. Start up

1. Before starting the dosing pump all works mentioned in "Installation" (chapter 7) must be carried out. Fill the pump with the oil supplied. At the same time the safety instructions must be observed.
2. The dosing pump is switched on by a control to be installed externally.
3. The manual or electrical capacity adjustment must be set to maximum stroke to improve priming. During first priming no backpressure should be applied. For this purpose we recommend to install a relief valve on the discharge side of the dosing pump.
4. A previously installed priming aid must be filled with chemical first. If the pump is not priming, remove the discharge valve and fill water or chemical (if not dangerous!) into the dosing head. Remount valve and start priming.
5. If a venting facility is available as separate unit, open it and wait until liquid escapes. Then close it again. In the case of effervescent liquids allow the liquid to escape permanently (approx. 1 drop for 1...3 strokes).
6. When correct operation is achieved, set to required output by means of the adjusting knob (refer to chapter 8) or the electrical remote adjustment. For approximation refer to the performance curves (chapter 5). Depending on the installation and the chemicals used, these values may differ and must be checked under operating conditions.
7. The manufacturer of the metering equipment is not responsible for damages due to excessive or low flow rates resulting from faulty pump settings or incorrect and insufficient installation of peripheral fittings.

9.1 Start up of MEMDOS MR with ATE-servomotor

Switch on the main drive motor of the metering pump. With an electrical interlocking system, only then can the ATE drive be adjusted.

To check the direction of rotation send short control pulses to the ATE servomotor.

If the direction of rotation is wrong, the supply lines (terminals 2 and 3 in the case of direct controls) are reversed.

The ATE servomotor must be moved to the final positions in order to check the limit stop mechanism of the integrated limit switches. When leaving the factory, the angle of rotation is 270°. If required, the angle of rotation and thus the maximum flow rate can be restricted. To achieve this, the upper trigger cam is shifted by the required value.

10. Maintenance

10.1 Lubrication

The diaphragm dosing pump MEMDOS MR requires little maintenance. The gear of the pump is lubricated with gear oil of viscosity class ISO-VG 460 according to DIN 51519 (corresponds to SAE 140 according to DIN 51512). The enclosed first filling must be renewed after approximately 500 operating hours. Further oil changes should be carried out every 5,000 operating hours. The filling capacity is about 0.75 l for simplex gears and about 0.9 l for duplex gears. The actually required quantity of gear oil can be determined by reading the oil gauge; the oil should cover half of the oil gauge.

10.2 Maintenance of bearings

The upper bearing of the pinion shaft is a sealed and permanently lubricated ball bearing. The other rolling bearings in the gearbox and the plain bearings of the diaphragm rod are lubricated by the gear oil. The oil also dissipates the heat generated.

All bearings must be examined for wear after 5000 hours of operation. The service life of the rolling bearings depends on the loads to which they are subjected. The bearings must be replaced after 5000 hours of operation if the dosing pump is operated at maximum load.

10.3 Maintenance of ATE-servomotor (optional)

The ATE servomotor is lubricated for life before leaving the factory. Nevertheless regular checks are recommended if the drive works under difficult operating conditions, such as a high ambient temperature or continuous operation. For relubrication of the ATE gear use molybdenum disulfite, e.g. "Molykote BR2plus" and "OKS400".

10.3.1 Manual adjustment of the ATE-drive Type AR30W...

In the case of an electrical failure of the ATE servomotor type AR30W, it can be adjusted manually by means of a hand crank. This part is available as accessory (Part No. 32.587).

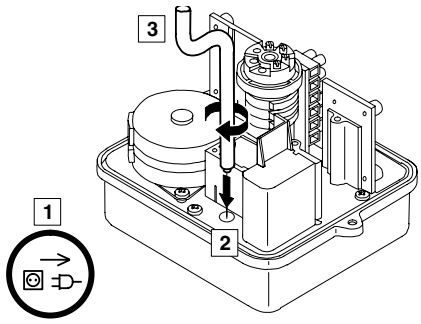
For manual adjustment proceed as follows:

1. Switch off power supply to the ATE servomotor.
2. Remove ATE cover.
3. Switch on main drive motor.
4. Insert hand crank in corresponding opening, as shown below, and turn into desired direction.

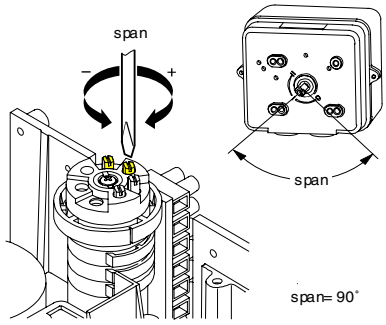
   Caution

   The final positions must not be crossed !
5. After manual adjustment remount the cover.

Insert hand crack and turn



Setting of angle of rotation



10.4 Replacing the diaphragm

In the case of a rupture the diaphragm can be replaced as follows:

1. The chemical contained in the metering line is drained so that the metering lines become pressureless. Please observe the aforementioned safety instructions for this purpose.
2. The flow rate of the metering pump is set to zero while the motor is running. Thus the diaphragm is moved to its front end position.
3. The head is removed using an appropriate tool.
4. Grasped at the edge, the diaphragm can now be turned out counterclockwise.
5. Before installing the new diaphragm the diaphragm flange section must be cleaned of the chemical. Otherwise the diaphragm might be attacked from the rear side.
6. The new diaphragm is turned in clockwise until it sits close (grease screw thread).
7. The stroke adjustment is now set to maximum while the motor is running.
8. Now the head is remounted by tightening it carefully with the screws.
   Screws must be tightened crosswise, e.g. top left – bottom right – top right – bottom left. The diaphragm is not properly sealed if the tightening torque is too low. If it is too high, the dosing head will be damaged. Required tightening torque for dosing head screws:

Diaphragm-Ø	Torque +/- 10%
90	6 Nm
120	6 Nm
150	10 Nm
185	12 Nm

9. After connecting the metering lines, the pump is started as described in chapter 9, startup.
10. If the diaphragm wear is excessively high, try to find out the reason. For this purpose, please refer to chapter 13 Troubleshooting.

11. Explosion-proof dosing pumps

11.1 General

The MEMDOS MR explosion-proof dosing pump is a motor-driven, explosion-proof diaphragm dosing pump of equipment category 2, group II.
In combination with an explosion-proof motor (Ex II 2 G E Ex e II T3 or Ex II 2 G E Ex d/de IIB/IIC T4) it is used to meter liquids in potentially explosive areas of zone I. The pump bears the Ex identification ”Ex II 2 G c k T4 03 ATEX D086".

Caution

The pump must not be used to meter gaseous media or solids.

11.2 Special conditions

Compliance with the minimum requirements for the zone classification must be ensured when using the dosing pump in potentially explosive areas. Both the pump itself and the motor must meet with the minimum requirements.

11.3 Dosing of flammable media

All metal parts in the intake and delivery piping must be grounded to prevent electrostatic discharges when dosing explosive liquids.
Stainless steel is recommended for the dosing head.
Dosing pumps with diaphragms measuring more than 90 mm in diameter are equipped with special conductive diaphragms to prevent static charging. Only the original diaphragm may be fitted when ordering replacement parts.

12. Spare parts

Genuine spare parts from Lutz-Jesco must be used. Wear parts for the MEMDOS MR are available as a set of spare parts containing the following:

- Pump diaphragm
- Valve balls
- Valve seats
- all valve seals

Pump Type	Dosing head-/ seal material	Part No.
MR 50...115	PP / Hypalon®	25411
	PP / Viton®	25423
	1.4571 / AF	25435
MR 140...210	PP / Hypalon®	25412
	PP / Viton®	25424
	1.4571 / AF	25436
MR 290	PP / Hypalon®	25413
	PP / Viton®	25425
	1.4571 / AF	25437
MR 400...980	PP / Hypalon®	34504
	PP / Viton®	34505
	1.4571 / Hypalon®	34506
	1.4571 / Viton®	34507

13. Troubleshooting

TYPE OF FAULT	POSSIBLE CAUSE	RECOMMENDED ACTION
Pump not delivering.	Valves leaking.	Clean and remove air from valves. (See also startup of pump). Tighten screw connections.
	Valves incorrectly installed.	Reassemble valves. Ensure that the valve balls of suction and discharge valve are located above the valve seats.
	Suction filter, foot valve or suction pipe leaking or blocked.	Clean and seal suction line.
	No stroke movement.	Return spring broken. Replace spring. Consider density of the chemical! Suction lift too high.
Pump delivering too little or irregularly.	Valves blocked or leaking.	Clean and re-seal valves.
Pump delivering too much.	Pressure on suction side too high (pump siphoning).	Install backpressure valve in discharge line.
Frequent diaphragm ruptures.	Diaphragm was not screwed into diaphragm rod as far as stop.	Screw in new diaphragm as far as stop.
	Injection nozzle blocked.	Clean injection nozzle; fit larger one, if necessary.
	Pressure peaks because metering line is too long or too narrow.	Change line or install pulsation dampener. For increased safety install relief valve (see installation example).
Pump very noisy.	Roller bearing defective.	Replace roller bearing.
	No or little oil in gearbox.	Refill oil, as described in section "maintenance".
Motor hums and doesn't start.	Wrong connection.	Check electrical wiring.
	Pressure too high.	Check process.

If the problem cannot be corrected on the basis of the above data, return the pump to the factory or contact our Technical Sales Service for further measures. Repairs will be carried out immediately.

14. Certificate of conformity

EC – Declaration of Conformity

We, **Lutz-Jesco GmbH**

Am Bostelberge 19
D – 30900 Wedemark

hereby certify
that the product described in the following complies with the relevant fundamental safety and sanitary requirements and the EC regulations mentioned below due to the concept and design of the version sold by us.

If the product is modified without our consent, this declaration loses its validity.

Product description:	Diaphragm Dosing Pump
Model designation:	Minidos A, Memdos TM, Memdos M, Memdos ML, Memdos E, Memdos MR., Memdos GMR
Relevant EC regulations:	EC Low-Voltage Directive (73/23/EEC) EC Directive Relating to Machinery (89/392/EEC) amended by 93/44/EEC
Applied harmonized standards, especially:	EN 292 – 1 and EN 292 – 2, Safety of Maschines prEN 809, Pumps and Pump Devices for Liquids, Safety Requirements

Date, Signature of Manufacturer: 2003/02/02 .....

Information on the signer: Mr. Lucjan Gogolin, Head of Technical Office

This declaration is no assurance of characteristics in the sens of the product liability law.
The safety notes in the operating instructions must be observed.

EC – Declaration of Conformity

We, **Lutz-Jesco GmbH**

Am Bostelberge 19
D – 30900 Wedemark

hereby certify
that the product described in the following complies with the relevant fundamental safety and sanitary requirements and the EC regulations mentioned below due to the concept and design of the version sold by us.

If the product is modified without our consent, this declaration loses its validity.

Product description:	Explosion proofed Diaphragm Metering Pump
Model designation:	Memdos E, Memdos MR
Relevant EC regulations:	EC Low-Voltage Directive (73/23/EEC) EC Directive Relating to Machinery (98/37/EC) EC Directive for Equipment and protective systems intended for use in potentially explosive atmospheres (94/9/EC)
Applied harmonized standards, especially:	EN 292–1 and EN 292–2, Safety of Maschines EN 809, Pumps and Pump Devices for Liquids, Safety Requirements EN 13463–1, Non-electrical equipment for potentially explosive atmospheres

Date, Signature of Manufacturer: 2003/07/01 . . . . . .

Information on the signer: Mr. Lucjan Gogolin, Head of Technical Office

This declaration is no assurance of characteristics in the sens of the product liability law.
The safety notes in the operating instructions must be observed.